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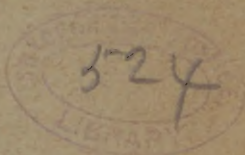
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NASAL POLYPUS:

ITS ASSOCIATION WITH ETHMOIDITIS
AND ITS TREATMENT BY
RESECTION OF THE MIDDLE TURBINATED BODY.*

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THE analysis of forty cases of nasal polypus, drawn from private practice, which will be outlined in this essay, confirms the view which I have advocated in previous papers that nasal polypus is not a primary or independent affection, but that it is a symptom, or at least a concomitant, of other nasal maladies which stand to it in the relation of cause and effect. This fact, however, should not lessen our efforts to elucidate the pathologic relationships of polypus, since thereby we will not only acquire more intimate knowledge of the underlying conditions, especially the various forms of ethmoiditis, but will also be led to devise more effective methods of treatment.

In 1888, in a paper on Nasal Myxomata read before the Chicago Medical Society, I advised a vigorous surgical

* Read before the American Laryngological Association at its sixteenth annual congress.

treatment, having for its object, first, access to and then eradication of the actual seat of attachment. Zuckerkandl's* researches on cadavers were summarized, by which he demonstrated that two thirds of all nasal myxomata originated from the middle meatus beneath the middle turbinated body, and that approximately two thirds of this number took origin from the edges of the hiatus semilunaris, which is a crescentic opening into the infundibular space whose upward and downward continuations enter, respectively, the frontal and maxillary sinuses, and which is located high up beneath the middle turbinated body.

In Fig. 1, which is accurately drawn from a divided skull, the middle turbinated body has been broken and turned upward, in order to disclose the hiatus semilunaris and bulla ethmoidalis.

In that paper it was recommended that hypertrophied inferior turbinated bodies be reduced to a normal size by cauterization, in order to facilitate the transmission of light and the passage of instruments to the seat of polyp growth, and also by the restoration thus of proper nasal drainage to prevent damming up of muco-purulent secretion in the middle meatus.

For the same reasons, septal excrescences, so frequently present, were to be removed. Meanwhile, as opportunity offered, the myxomata were to be carefully snared off close to the base by means of a cold wire snare, when, in some instances in which sufficient space existed, it would be found possible to insinuate a slightly curved cautery point electrode beneath the middle turbinated body with which to destroy the actual seat of attachment. Further experience taught, however, that there were many cases in which this latter procedure was inadvisable on account of the tendency

* *Anatomie der Nasenhöhle*, pp. 64 et seq.

to the formation of adhesions, and to the production of a septic eschar in a circumscribed location. Recently I have



FIG. 1.—Representing the outer wall of the left naris with the middle turbinated body turned upward to show beneath the hiatus semilunaris, to the edges of which polyps are frequently attached.

substituted satisfactorily curetting of this area for cauterization. A small but firm and sharp curette is insinuated up-

ward beneath the middle turbinated body, in the direction from which the polyps proceeded, and their attachments, especially the borders of the hiatus and the bulla ethmoidalis, are well scraped.

In 1891, in a supplementary paper before the American Laryngological Association, I advised, as part of the radical treatment of nasal polypus, in certain cases in which the polyps emanated from the region of the hiatus semilunaris, the removal of the antero-inferior part of the middle turbinated bone in order to facilitate access to the actual points of development. Additional experience with this operation has but confirmed its utility and demonstrated its harmlessness, so that it will presently be referred to again more in detail. It was pointed out that the middle turbinated body, a process of the ethmoid bone, was rarely itself in a healthful condition in these cases; that it was often enlarged, or degenerated, or in a cystic state—a phase of the subject which it is desired to amplify in the present paper.

Through close observation of individual cases over prolonged periods, aided by the wider field for study of the deeper parts which is afforded by the operation of resection of the middle turbinated body, it has become evident that nasal polypus is usually a symptomatic manifestation of a form of degeneration of the ethmoidal muco perosteum, which frequently involves not only the middle turbinated bone, but also to some degree the ethmoid cells, and which for convenience is designated as ethmoiditis.

As a reminder of the scope of the various forms of ethmoiditis I would refer to the classification formulated by Bosworth,* but without intention of committing myself to its limitations: “(1) Extracellular myxomatous degeneration, the disease being limited to the middle turbinated

* *Transactions of the American Laryngological Association*, 1891.

body; (2) intracellular myxomatous degeneration, in which not only the middle turbinated body, but also the ethmoid cells had undergone myxomatous degeneration; and (3) purulent ethmoiditis, which may or may not be associated with myxomatous degeneration of the ethmoid, but which usually is associated with nasal polypi."

In fact, any or all parts of the ethmoid bone may be primarily affected by this process, which is serious enough in any stage, but which, if it be permitted to assume the suppurative type, becomes a most formidable affection. The deeply placed anfractuous ethmoid cells are difficult to drain, and infection of the maxillary, frontal, and sphenoidal sinuses is very liable to occur. Cases of exophthalmia with loss of sight from the pressure of empyema of the ethmoidal and sphenoidal sinuses have been reported by Dr. Hermann Knapp,* in which he was compelled to operate from the orbit. Fatal termination by infection of the cerebral meninges must also be regarded as among the possibilities in such cases. Mention is made of these points because it will appear from the cases reported as typifying the various forms of associated ethmoid disease that polypus is commonly one of the earliest prominent manifestations of ethmoiditis, and that when present the case should not be dismissed with a simple snaring as adequate to the occasion, but that it should be viewed as at least suggestive of a developing disorder which is liable to culminate seriously unless controlled. Furthermore, the treatment advised, especially resection of the middle turbinated bone, in addition to its efficacy for the polyps themselves, should be regarded as a prophylactic measure against the development of the more serious suppurative type of ethmoiditis by facilitating drainage from the ethmoid cells.

There is little to suggest concerning the ultimate cause

* *Journal of the American Medical Association*, December 2, 1892.

of simple œdematous or myxomatous ethmoiditis beyond a possible impairment of the vaso-motor nerve force supplied to this area, which, however, is more manifest in the next variety of the disease, which I will designate as vaso-motor ethmoiditis. The following types, suppurative ethmoiditis and necrosing ethmoiditis, can reasonably well be traced as outgrowths of the former varieties.

Regarding the microscopic structure of nasal polypi and of myxomatous tissue, there is nothing to add to the studies of Jonathan Wright,* recently reported to this association, in which he described distinctions between the so-called nasal myxoma and true myxoma, the inference being that the nasal growths are of inflammatory origin and to be ascribed to hypertrophic rhinitis. This limited causation is exemplified in my series, but only by a few cases, and the reason for the comparatively rare transformation of the common hypertrophic process into one of mucoid or œdematous character still remains a mystery.

I will attempt a clinical classification of the various conditions which are found associated with and underlying the formation of nasal polypus:

TYPE I. NASAL POLYPUS WITH HYPERTROPHIC RHINITIS.

CASE I.—Miss T., aged ten years, has enormous hypertrophy of the left inferior turbinated body and numerous polyps which proceed from the middle meatus and are closely impacted between the neighboring turbinated bodies and the sæptum (Figs. 2 and 3). They are continuously imbedded in a mass of thick, viscid muco-purulent secretion. In the other nostril hypertrophy is present, but it is insufficient to obstruct the drainage, and no polyps are visible. Operations first by the cold wire snare resulted in the removal of numerous growths, but they redeveloped as rapidly as removed, springing up like mushrooms in the sodden soil maintained by the imprisoned secretions. Then,

* *New York Medical Journal*, November 4, 1893.

after several weeks of such trials, the inferior turbinated body was cauterized along its entire extent, being reduced in front,

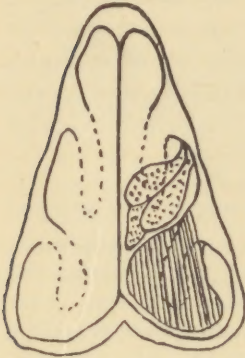


FIG. 2.

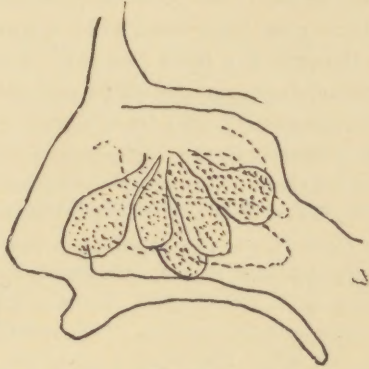


FIG. 3.

where it especially interfered with drainage, almost to a rudiment. One was then enabled to trace the tumors to their exact seat of attachment in the immediate vicinity of the hiatus semilunaris, and to thoroughly eradicate them by reaching that position with a cautery point. No recurrence. Cure complete, as verified by several re-examinations during the past six years.

This patient presented no symptoms of ethmoiditis other than the suggestiveness of the polyps, and since permanent recovery followed promptly on reduction of the hypertrophic rhinitis, it is a fair inference that the latter affection alone, leading to defective drainage, was the antecedent condition to the development of

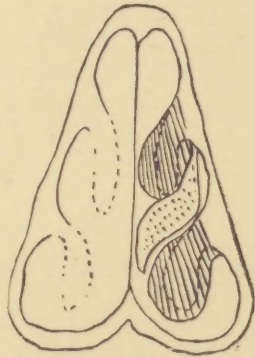


FIG. 4.

nasal polypus. This case may be considered as fairly typical of a group of six selected from the entire series of forty cases. One of them possessed but a single polypus which grew from the middle meatus and has not recurred in the past five years (Fig. 4). Another was affected with a large single polypus which projected into the nasopharynx and has not recurred for one year. The others have passed from observation.

TYPE II. NASAL POLYPUS WITH SIMPLE MYXOMATOUS ETHMOIDITIS.

CASE II.—Mr. B., aged forty years, complains of pressure in the ethmoid region. He had several polyps removed five years ago. Examination discloses great enlargement of the middle turbinated bodies, which press firmly against the septum on each side. They have a glistening aspect and a pultaceous

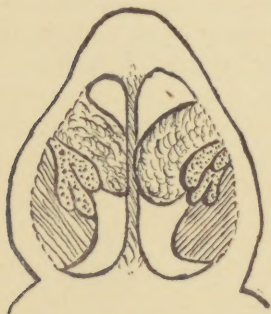


FIG. 5.

touch, indicative of œdematous or myxomatous degeneration rather than of ordinary hypertrophy (Fig. 5). A compact bunch of small polyps juts out from beneath each middle turbinated body, having in the course of time forced the latter quite a distance from the external wall of the nose, the space thus made being so much wider than usual that the polyps can readily be inclosed by a snare close to the hiatus semilunaris, through which

they seem to project as if emanating from points in the ethmoid bone still higher up.

The patient has a peculiar facial aspect; the base of the nose, externally, is broadened, this deformity being produced by actual thickening of the superior maxillary bone near the line of articulation with the nasal bone, and there is infraorbital swelling of a quasi-œdematous nature, which simulates the physiognomy of Bright's disease. Such facial swellings, bilat-

eral or unilateral, I have observed in other cases, both of nasal polypus and of ethmoiditis without polypus, and have ascribed them to intranasal pressure from distention in the ethmoid region.

After removal of the polyps by the cold wire snare the borders of the hiatus semilunaris were scraped to the bone by insinuating a small sharp curette upward and outward beneath the middle turbinated body. The middle turbinals were then cauterized as if for hypertrophic rhinitis, which materially reduced their size. Resection of the middle turbinated bodies, not seeming absolutely necessary, was not done in this case, although it is possible that such would have been the better line of treatment, and that it will be required at a future time. The facial swellings have been greatly improved and the intranasal discomfort suspended by the treatment.

In this case, the myxomatous degeneration of the middle turbinated bodies (processes of the ethmoid bone) and the polyps themselves, which project at least from the immediate vicinity of the median ethmoid cells, together with the facial deformities, indicate considerable involvement of the ethmoid structure; but the designation œdematous or myxomatous ethmoiditis is more certainly justified by the next case, which presents the same pathologic conditions in kind, only more advanced in degree:

CASE III.—Mr. N. M., aged fifty years, first came under treatment in 1884, at which time I removed a few polyps and reduced by the cautery and snare the *inferior* turbinated bodies, which were then greatly hypertrophied. He has continued to suffer a variety of noteworthy reflex symptoms: for instance, a sense of pressure far back between the eyes becomes at times so severe as to induce a high degree of nervous excitement culminating in cardiac palpitation, which occasionally leads to actual syncope. The heart is devoid of organic lesions. Re-examination in 1894 discloses enormous osseous overgrowth with polypoid degeneration now of the *middle* turbinated bodies, which together with a few small polyps literally

pack the upper channels of the nose. The cautery here was obviously inadequate to the requirements, so I performed resection of the middle turbinated bodies, piecemeal, by means of the snare, serrated scissors, and bone forceps. This laid bare the ethmoid cells, from which polyps could be seen to protrude, and whose walls were in a similar state of polypoid degeneration. These parts were scraped by a sharp curette. On the

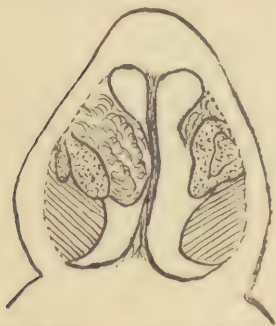


FIG. 6. —Representing on one side polyps growing from the ethmoid region, visible only after resection of the middle turbinated body.

removal of the middle turbinated body, when two, of good size but of flat shape, were exposed which projected from the region of the ethmoid cells (Fig. 6). The antrum of Highmore had been opened in 1893 by the patient's dentist, two small polyps being found therein but no pus.

This case would conform to the variety of ethmoid disease designated by Bosworth* "intracellular polyp without pus discharge," of which his series comprised but a single case. It only differs from my preceding

case, however, in the degree of development of the "intracellular" polyps, and these two cases will serve to typify a group which comprises fourteen of the entire series of forty cases.

In most of the fourteen cases the middle turbinated bodies presented evidence of myxomatous degeneration, and two of them had each a large typical polypus developed from this process of the ethmoid, which was removed in each instance together with a part of the bone itself. Five in all of the fourteen cases of this group were subjected to

* *Transactions of the American Laryngological Association*, 1891.

resection of the antero-inferior part of the middle turbinated bone, which operation exposed the hiatus semilunaris and the nasal surface of some of the ethmoid cells, especially the bulla ethmoidalis, and in those so treated these parts of the ethmoid mucosa were found to be the seat of polypoid excrescences. In all of the cases of this group not thus exposed by operation, polyps were observed to project from beneath the middle turbinated bodies, which were traceable toward the hiatus semilunaris and ethmoid cells. It would seem but natural that many of the polyps should form attachments to the edges of the hiatus, as was demonstrated by Zuckerkandl, while they are gravitating through this groove or being forced through it by œdematous pressure in the cells above. The point is that, though distinct polyps are found to be attached to the borders of the hiatus, it is probable that in a large proportion of cases the initial lesion is a diffuse mucoid or œdematous ethmoiditis.

TYPE III. NASAL POLYPUS WITH VASO-MOTOR ETHMOIDITIS.

CASE IV.—Miss McC. was referred to me by Dr. E. J. Gardner in 1889. She had suffered from complete nasal obstruction for several years, together with asthma and hay fever. There were multiple polypi, which, after removal, would redevelop with astonishing rapidity, growing in profusion not only from the middle meatus, but also from the superior meatus posteriorly, and from both the middle and superior turbinated bodies. The entire nasal mucosa was in a state of œdematous tumefaction, as if devoid of vaso-motor control.

The nostrils at best would have been considered narrow, the middle turbinated bodies were crowded, and drainage was defective. Efforts at cauterization resulted in troublesome adhesions and accomplished but little good. I ultimately removed the antero-inferior part of each middle turbinated body with the greatest possible benefit to the patient. Drainage was thereby restored throughout the middle and superior nasal channels

as well as from the ethmoid cells, and the parts began to assume a healthier aspect.

The hiatus semilunaris and the ethmoid cells just above, which were thus exposed, were found filled and covered with polyp buds and myxomatous tissue. These were scraped by sharp curettes and picked off by cutting forceps—a process which was found much more effective in this region than cauterization. The patient is still seen at monthly intervals, when I sometimes pick off a polypoid excrescence or a piece of suspicious tissue to insure against redevelopment. She suffers only an occasional “filling up” of the nose, respiration being at most times free. She has escaped hay fever during the past three seasons, and is practically but not absolutely free from asthma.

This case is remarkable as an extreme example of the type—vaso-motor ethmoiditis; for the length of time, five years, during which she has persistently submitted to treatment; for the quantity and novel character of the surgical treatment, and for the satisfactory result attained.

The case is typical of a group which comprises nine of the entire series of forty cases, the salient features of which were the same in kind in all of the nine cases, although differing somewhat in degree. Three other patients of the group were subjected to the operation of resection of the middle turbinated bodies on one or both sides, and the same myxomatous degeneration and tumefaction of the mucosa of the underlying ethmoid cells was disclosed.

Asthma was a universal symptom, which to some extent has influenced the grouping together of these particular cases, since I am convinced that asthma of this variety is caused by a similar vaso-motor tumefaction of the bronchioles. Four of the nine cases suffered from hay fever or, as it is termed also by Bosworth, vaso-motor rhinitis, which further indicated the possession of a fundamental neurotic habit. Distention of the erectile tissues of the nose was common to the group, but in addition they all presented a

supersensitiveness in excess of that which attaches to ordinary hypertrophic rhinitis, various irritants, such as dust, coal smoke fog, aroma from horses, etc., sufficing at any season to excite a form of tumefaction suggestive of vasodilatation. The ethmoid region in most of the cases seemed especially sensitive.

All points considered, the descriptive term, vaso-motor ethmoiditis, would seem justified as applied to this group of cases.

TYPE IV. NASAL POLYPUS WITH SUPPURATIVE ETHMOIDITIS.

CASE V.—Mr. McC., aged fifty years, has suffered from nasal polypi for ten years. One year ago intense pain commenced over the left *frontal* sinus, then supraorbital bulging and tumefaction, and finally, after months of intense suffering, spontaneous discharge of pus occurred from the frontal sinus, having forced its way through the bony wall of this cavity and opened between the eyeball and the supraorbital arch of the frontal bone.

He then applied to Dr. Christian Fenger, who referred him to me with a view to avoidance of an external operation by reopening, if possible, the natural channel by intranasal treatment.

The left middle turbinated bone was enormously enlarged and in an advanced state of myxomatous degeneration, the whole mass, together with some small polyps, being packed in place so firmly as to obliterate the middle meatus and to press the septum toward the opposite side. I removed this diseased mass, bone and all, in fragments at different sittings by means of cutting forceps, which operation also served to expose polypoid excrescences with suppuration of the ethmoid cells, which were then scraped and drained. The other nostril required similar treatment, but to a less extent. The result is satisfactory concerning the nose, but the frontal fistulous discharge, although greatly diminished, is still perceptible, which indicates continued obstruction of the natural drainage channel, doubtless by polypoid tissue beyond intranasal reach. Attempts at catheterization of the frontal sinus *via* the nose and infundibulum

were not entirely successful even after the removal of the degenerated tissue which had represented the middle turbinated body.

Polypus, in association with suppurative ethmoiditis, is represented in this series of forty by a group of six cases, of which the one detailed is essentially typical. It alone, however, was complicated by empyema of the frontal sinus. It and three others of the group, making four out of six, were complicated by empyema of the maxillary sinus.

In the case related the suppurative ethmoiditis and polyp formation were bilateral, although worse on the left side, on which the complications occurred. In the other three cases polyps existed in both nares, although suppuration of the ethmoid cells was unilateral in each and occurred on the same side as the empyema of the antrum.

In three of these cases the maxillary sinus was opened and drained, then resection of the middle turbinated bone was made, and in one case the posterior ethmoid cell was well opened by revolving burrs, which was done by following the lead of a probe which could be passed into this suppurating cavity. One case declined operation other than removal of the polyps; and the diagnosis of suppurative ethmoiditis was made by observing the escape of pus through the superior meatus into the nasopharynx, which indicated involvement of the posterior ethmoid cells.

The two remaining cases of this class were subjected to resection of the middle turbinated bodies, by which better drainage was secured, this making five of the group of six cases which were thus treated, in addition to other measures, all being thereby immensely benefited.

Curiously enough, none of these cases suffered from asthma. In two, denuded bone could be felt by a probe before operating, and in one case the odor was indicative of necrosis.

I believe that purulent ethmoiditis with polypus is to be regarded as a sequel to the simple myxomatous type ; that suppuration of the ethmoid cells occurs only after myxomatous tissue has accumulated sufficiently to obliterate their natural drainage channels. This view is substantiated by Case V, in which suppuration of the frontal sinus occurred in conjunction with obliteration of its outlet. As mentioned by Bosworth,* "the natural result of a damming back of a mucous secretion is the development of a purulent inflammation." The sequence of events would then be, first, simple myxomatous ethmoiditis, which may assume as a variation the type of vaso-motor ethmoiditis with asthma, then nasal polypus, and finally suppuration of the ethmoid cells and of the collateral sinuses by obstruction to their outlets either by distinct polyps or myxo-degenerated tissue.

Herein lies the prophylactic value of the operation of resection of the middle turbinated body in cases belonging to type ii, polypus with simple myxomatous ethmoiditis, and to type iii, polypus with vaso motor ethmoiditis, for in addition to exerting a curative influence over these earlier forms of the disease, it will tend to prevent the culmination of the suppurative type of ethmoiditis, by maintaining drainage from the ethmoid cells and by facilitating access to the hiatus semilunaris for the radical removal of polypoid tissue. In like manner it should tend to prevent the troublesome complications of empyema of the maxillary and frontal sinuses, and the not impossible fatal contingency of infection of the cerebral meninges.

I would not imply that the operation should be made in every case ; but it should be done in most cases in which the middle turbinated body has undergone myxomatous

* Various Forms of Disease of the Ethmoid Cells. *Trans. of the Am. Laryn. Assoc.*, 1891.

degeneration with downward and lateral enlargements, so that it packs the space in which it lies, and in certain other cases in which by reason of abnormal conformation it exerts undue pressure on the septum, or when it is necessary to gain space for drainage or instrumental manipulation.

Conversely, if the middle turbinated body be of normal contour, and present no impediment to drainage, to the transmission of light or instruments, there will then be no occasion to interfere with it, and, it may be further said, under such conditions it would be most difficult to perform its resection.

TYPE V. NASAL POLYPUS WITH NECROSING ETHMOIDITIS.

Grouped together under the name of necrosing ethmoiditis, Dr. Edmond Woakes * gave the first succinct account of some of the conditions which have been described and classified in this paper. His contention that nasal polypus indicated a chronic inflammation of the tissues of the ethmoid is in large measure substantiated by the foregoing analysis of cases; but that necrosis or even caries of bone is a "usual" accompaniment is not confirmed, so that it would seem wise to limit the term necrosing ethmoiditis to the class of cases in which necrosis, or at least caries, actually exists and can be unmistakably demonstrated.

Exactly what determines necrosis is not yet clear, but it is evident that certain cases of "polypus with simple myxomatous ethmoiditis" and of "polypus with vasomotor ethmoiditis" may exist for years without necrosis, other cases finally succumbing to this complication, while still others present the element of necrosis almost from the incipency and as the main feature of the disease.

Of the entire series of forty cases only five were accom-

* Nasal Polypus, etc., in Relation to Ethmoiditis, 1887.

panied by unmistakable necrosis of bone, of which one has already been classed under type ii and two under type iii, the necrosis being an incidental rather than a predominating feature of these cases. The remaining two cases were characteristic of the disease as portrayed by Woakes. The details of one will suffice :

CASE VI.—Miss P., aged twenty years ; catarrhal symptoms for years. Examination discloses atrophic naso-pharyngitis, with horribly foetid incrustation. The right middle turbinated body is much enlarged and has undergone cleavage, presenting the appearance of two bodies side by side. From the cleft protrude several small polyps or polyp buds, and others exist in the immediate vicinity. A fine probe inserted into the fissure detects denuded bone (Fig. 7).

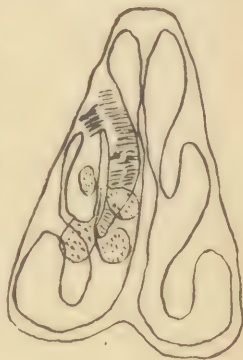


FIG. 7.

Resection of the middle turbinated body should have been made in this case, but its treatment antedated my experience with the operation. Thorough cauterization and other appropriate measures sufficed to ameliorate the symptoms, and the patient passed from observation.

Annotations on Treatment.—The general surgical treatment of nasal polypus and its complications has been outlined in the body of the paper, and it only remains to describe briefly the technique of resection of the middle turbinated body, and to describe the instruments which I have devised and adapted for this use.

Only rarely can the operation be wholly accomplished by the snare alone ; but a snare is useful either to remove a piece of the bone which happens to project sufficiently to

be enveloped by the wire, or to finish a resection that has been partly made by serrated scissors. The snare must be capable of manipulation by one hand, and should combine lightness and balance with strength of construction. These requirements are fulfilled by the mechanism of Slover Allan.

The curved, serrated scissors (Fig. 8) which I have devised for the purpose can be insinuated, one blade on each side of the anterior end of the bone, and a cut made for a variable distance backward, when the operation, if not complete, can be finished by the snare or forceps.

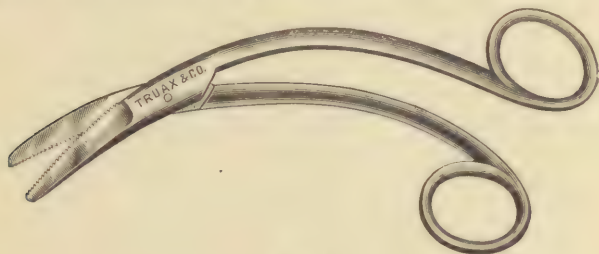


FIG. 8.

I have also devised a bone cutting forceps for this purpose, but, in addition, I have found two other forceps of service, especially for the removal of the bone in fragments; one of these was devised by Prince to aid in removal of the inferior turbinated bone, and the other, the sharpest of all, was evidently devised for sæptum work. Unless it be an easy case, it will be unnecessarily painful to the patient to remove the desired quantity of the bone at a single operation. I more often accomplish it fragment by fragment, always desisting for the time as soon as hæmorrhage obscures the view, and this method is absolutely necessary in case the middle turbinated body is greatly enlarged and closely impacted within its space. The exact amount re-

moved has varied in different cases, from a small fragment of the antero inferior part to a maximum of about one half of the entire bone.

As enumerated, group by group, I have made the resection in thirteen of the forty cases, and in retrospect it seems to me that there were still others in whom the operation was both indicated and feasible, probably enough to raise the proportion to about one half of the entire series.

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